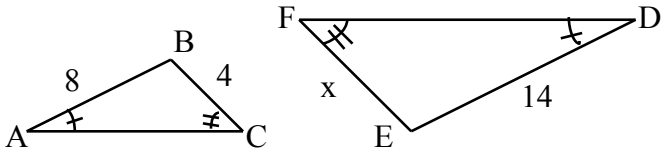
RATIO APPLICATIONS #10

Ratios and proportions are used to solve problems involving similar figures, percents, and relationships that vary directly.

Example 1

ΔABC is similar to ΔDEF. Use ratios to find x.



Since the triangles are similar, the ratios of the corresponding sides are equal.

$$\frac{8}{14} = \frac{4}{x} \quad \Rightarrow \quad 8x = 56 \quad \Rightarrow \quad x = 7$$

Example 2

a) What percent of 60 is 45?

b) Forty percent of what number is 45?

In percent problems use the following proportion: $\frac{\text{part}}{\text{whole}} = \frac{\text{percent}}{100}$.

a) $\frac{45}{60} = \frac{x}{100}$

$60x = 4500$

$x = 75 \ (75\%)$

b) $\frac{40}{100} = \frac{45}{x}$

$40x = 4500$

$x = 112$

Example 3

Amy usually swims 20 laps in 30 minutes. How long will it take to swim 50 laps at the same rate?

Since two units are being compared, set up a ratio using the unit words consistently. In this case, "laps" is on top (the numerator) and "minutes" is on the bottom (the denominator) in both ratios. Then solve as shown in Skill Builder #9.

$$\frac{\text{laps}}{\text{minutes}}: \ \frac{20}{30} = \frac{50}{x} \quad \Rightarrow \quad 20x = 1500 \quad \Rightarrow \quad x = 75 \text{minutes}$$

Each pair of figures is similar. Solve for the variable.

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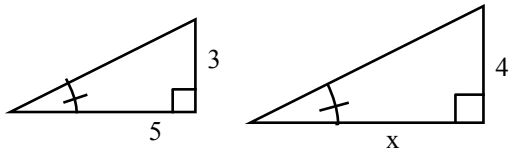

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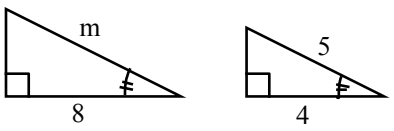

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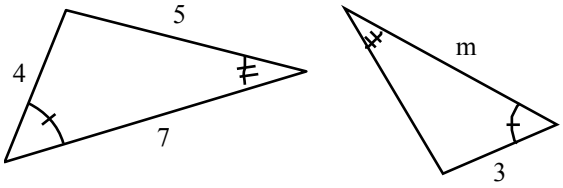

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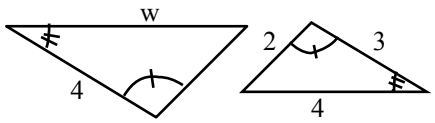

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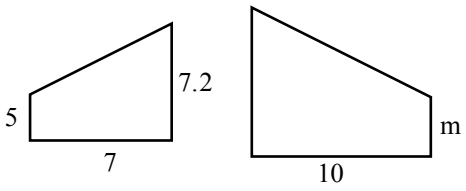

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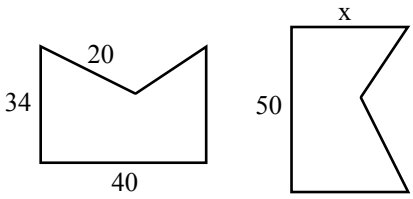

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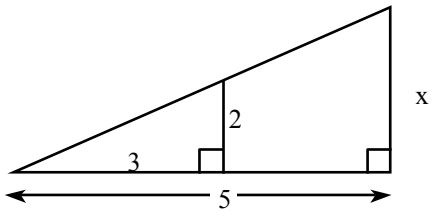

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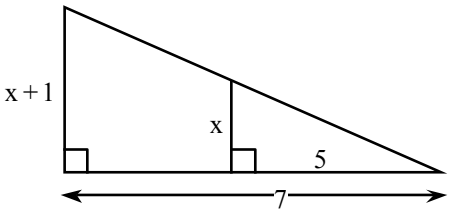

Write and solve a proportion to find the missing part.

9. 15 is 25% of what?

10. 12 is 30% of what?

11. 45% of 200 is what?

12. 32% of 150 is what?

13. 18 is what percent of 24?

14. What percent of 300 is 250?

15. What is 32% of $12.50?

16. What is 7.5% of $325.75?

Use ratios to solve each problem.

17. A rectangle has length 10 feet and width six feet. It is enlarged to a similar rectangle with length 18 feet. What is the new width?

18. If 200 vitamins cost $4.75, what should 500 vitamins cost?

19. The tax on a $400 painting is $34. What should the tax be on a $700 painting?

20. If a basketball player made 72 of 85 shots, how many shots could she expect to make in 200 shots?

21. A cookie recipe uses $\frac{1}{2}$ teaspoon of vanilla with $\frac{3}{4}$ cup of flour. How much vanilla should be used with five cups of flour?

22. My brother grew $1\frac{3}{4}$ inches in $2\frac{1}{2}$ months. At that rate, how much would he grow in one year?

23. The length of a rectangle is four centimeters more than the width. If the ratio of the length to width is seven to five, find the dimensions of the rectangle.

24. A class has three fewer girls than boys. If the ratio of girls to boys is four to five, how many students are in the class?